

CLAIMS

What is claimed is:

1. An apparatus for retention and protection of a radio frequency
5 identification tag in a recess having a bottom in an oil drill string, comprising:

a tag housing press fit into the recess in the oil drill string;

said tag housing having a proximal surface and a distal surface
10 wherein said distal surface is adjacent the bottom of the recess;

a tag electronic circuit positioned adjacent said distal surface of said
tag housing;

15 a tag antenna positioned adjacent said proximal surface of said tag
housing;

at least one antenna lead extending from said tag electronic circuit to
said tag antenna;

20 a plug of protective material positioned adjacent said proximal surface
of said tag housing covering said tag housing and said tag antenna.

2. The apparatus of claim 1 wherein said tag housing is constructed of a material having a low Young's Modulus.

3. The apparatus of claim 2 wherein said tag housing is constructed of titanium.

4. The apparatus of claim 1 wherein said tag housing is constructed of ceramic.

5. The apparatus of claim 1 wherein said plug surrounds and encapsulates said tag housing.

6. The apparatus of claim 5 wherein said plug further surrounds and encapsulates said tag antenna.

7. The apparatus of claim 1 wherein said plug is an electromagnetically conductive material.

8. The apparatus of claim 7 wherein said plug is an electromagnetically conductive plastic type material.

9. The apparatus of claim 8 wherein said plug is an electromagnetically conductive plastic type material having a low dielectric constant.

10. The apparatus of claim 1 wherein said antenna is a patch antenna.

11. The apparatus of claim 1 wherein said antenna is a coil antenna.

5 12. The apparatus of claim 1 wherein said at least one antenna lead extends through said tag housing.

10 13. The apparatus of claim 1 wherein said at least one antenna lead includes insulation thereon thereby insulating said at least one antenna lead from said tag housing.

15 14. The apparatus of claim 13 wherein said insulation is of a truncated cone shape and said tag housing includes at least one truncated cone shaped receiver shaped to receive said at least one antenna lead having said truncated cone shaped insulator thereon.

20 15. The apparatus of claim 13 wherein said insulation is of a cylindrical shape and said tag housing includes at least one cylindrically shaped receiver shaped to receive said at least one antenna lead having said cylindrically shaped insulator thereon.

16. The apparatus of claim 1 wherein said distal surface of said tag housing includes a cavity therein to receive said tag electronic circuit.